

Detection of multidrug-resistant *E. coli* O157:H7 through NARMS, 1996-2001

V. Nargund, S. Gottlieb, J.E. Stevenson, J. Whichard, F.J. Angulo, and the NARMS Working Group

Background: Each year, *Escherichia coli* O157 is estimated to cause more than 73,000 infections and 3,650 cases, or 5%, result in hemolytic uremic syndrome in the United States. Cattle are an important reservoir for *E. coli* O157 and outbreaks have been associated with consumption of ground beef. Monitoring for emerging resistance in these bacteria is important in understanding the epidemiology of antibiotic resistance in animals and humans.

Methods: From 1996-2001, 17 public health laboratories participating in the National Antimicrobial Resistance Monitoring System (NARMS) sent every 5th *E. coli* O157 isolate to CDC for antimicrobial susceptibility testing. Minimum inhibitory concentrations were determined via automated broth microdilution (Sensititre®). Pulsed Field Gel Electrophoresis (PFGE) patterns were posted to PulseNet and compared using standard methodology. Telephone interviews were conducted with patients whose stool specimen yielded 6 multidrug-resistant *E. coli* O157 isolate that were indistinguishable by PFGE.

Results: NARMS surveillance identified six isolates of highly multidrug-resistant *E. coli* O157:H7 among the 1,651 isolates tested from 1996–2001. Highly multidrug-resistant isolates were resistant to ampicillin, amoxicillin-clavulanic acid, cefoxitin, ceftiofur, cephalothin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline and were indistinguishable by PFGE. The patients ranged in age from 10 to 83 years, with a mean age of 41 years. The patients were located in Kansas (2), California (1), Connecticut (1), Colorado (1), and Minnesota (1). All six patients reported diarrhea and abdominal cramping; 66% reported blood in their stools, 50% reported fevers, and 50% reported vomiting. All patients presented to an emergency room and 3 were hospitalized. The three hospitalized patients were treated with fluoroquinolones. None developed hemolytic uremic syndrome, and none died. None of the patients traveled outside the United States or visited a farm during the week before illness. Four patients reported eating ground beef in the week before illness; two noted that it was undercooked.

Conclusions: This study documents the emergence of a highly multidrug resistant strain of *E. coli* O157 in the United States. Infection in humans appears to be domestically-acquired and may be associated with the consumption of undercooked ground beef. Continued surveillance of *E. coli* O157 may provide important information about emerging resistance among bacteria in our food supply.